

Claims

1. Method for screening biological samples for the presence of the metabolic syndrome in the sample donors, comprising the steps of
 - a) irradiating the sample by radiation
 - b) capturing radiation which has interacted with the sample
 - c) evaluating said captured radiation for spectral characteristics
 - d) classifying said sample according to the presence of the metabolic syndrome based on its spectral characteristics.
2. Method according to claim 1, wherein said radiation is infrared radiation in the wavelength range of 2.5 to 25 micrometer..
3. Method according to claim 1, wherein said radiation is visible or near infrared radiation in the wavelength range of 0.4 to 1.5 micrometer and the type of interaction is Raman scattering.
4. Method according to claim 1 or 2 or 3, wherein said sample is blood or a blood derivative as plasma or serum.
5. Method according to claim 1, wherein said sample is applied to a sample carrier prior to irradiation.
6. Method according to one of the preceding claims, wherein said sample is dried prior to step a).
7. Method according to claim 1, wherein said sample is applied to a flow cell prior to irradiation with a small thickness preferable in a range of 6 to 30 μm .
8. Method according to claim 1, wherein said captured radiation is reflected or transmitted infrared radiation or Raman scattered radiation.
9. Method according to claim 5, wherein said carrier has a reflective surface.

10. Method according to claim 5, wherein said carrier has an infrared-transmissive plastic foil.
11. Method according to claim 1, comprising the following training steps for said classification,
 - performing steps a) and b) with samples of known classification, and
 - training an evaluation program so that it assigns the samples to the known classifications.
12. Method according to claim 11, wherein a reference database is generated from said samples of known classification.
13. Method according to claim 11, wherein parameters of a an evaluation function are set during said training.
14. Method according to claim 1 or 13, wherein said classification involves the application of an evaluation function with predetermined parameters to the spectral characteristics of the biological sample of unknown classification.
15. Method according to claim 1 or 11, wherein said classification comprises a multivariate evaluation.
16. Method according to claim 1, wherein said evaluation uses spectral information from molecular vibration frequencies of the sample corresponding to a region of 1500 to 1800 wavenumbers (region II).
17. Method according to claim 1, wherein said evaluation uses spectral information from molecular vibration frequencies of the sample corresponding to a region of 2300 to 3200 wavenumbers (region III).
18. Method according to claim 1, wherein said evaluation uses spectral information from molecular vibration frequencies of the sample corresponding to a region of 1000 to 1300 wavenumbers (region I).
19. Method according to the claims 16 to 18, wherein the evaluation uses spectral information from molecular vibration frequencies of the following combinations:
 - vibration in region II and III
 - vibration in region I and III

- vibration in region I and II
 - vibration in region I, II and III.
20. System for screening biological samples for the presence of the metabolic syndrome in sample donors, comprising
- a) a radiation source for irradiating the sample
 - b) a detector for capturing radiation which has interacted with the sample
 - c) an evaluation unit for evaluating said captured radiation for spectral characteristics
 - d) a classification unit for classifying said sample according to the presence of the metabolic syndrome based on said spectral characteristics.
21. System according to claim 20, wherein said system comprises a sample carrier onto which sample is applied prior to irradiation.
22. System according to claim 21, wherein said carrier has a diffusely reflective surface.
23. System according to claim 20, wherein said system comprise a flow cell into which a sample is applied prior to radiation.
24. System according to claim 20, wherein said radiation source and said detector are arranged to perform infrared absorption measurement or Raman scattering measurement.
25. System according to claim 20 wherein said classification unit comprises a microprocessor and a program unit being programmed to perform a classification.
26. System according to claim 25, wherein said program unit being programmed with a multivariate evaluation based on parameters determined on samples of known classification.
27. System according to claim 20, wherein said evaluation unit uses spectral information from molecular vibration frequencies of the sample corresponding to the regions given in one of the claims 16, 17 or 18 or uses spectral information from the frequency region combinations of claim 19.